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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,877	07/06/2001	Palle Schneider	10179.204-US	4404

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EXAMINER

SLOBODYANSKY, ELIZABETH

ART UNIT	PAPER NUMBER
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1652

DATE MAILED: 12/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/869,877

Applicant(s)

SCHNEIDER ET AL.

Examiner

Elizabeth Slobodyansky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 October 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 1 and 3-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some    \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.                      6) ☐ Other: \_\_\_\_\_

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### **DETAILED ACTION**

This application is a 371 of PCT/DK01/00292 published as WO 01/83761 in English on November 8, 2001.

Claims 1-15 are pending.

### ***Election/Restriction***

Applicant's election with traverse of Group II, claim 2, and species of a substitution at position 177 in SEQ ID NO:10, in Paper No. 7 filed October 25, 2002 is acknowledged. The traversal is on the ground(s) that "Groups I, II and III are directed to laccase variants and therefore relate to a single inventive concept. Moreover, the inventions designated IV and V are directed to processes using said laccase variants and therefore also relate to the same single inventive concept as Groups I-III" (Remarks, page 2). This is not found persuasive because Groups I-III are directed to materially different and patentably distinct products having different sequences, properties, utilities and sources. 37 CFR 1.475 does not provide for multiple products or methods within a single application and therefore unity of invention is lacking with regard to Groups I, II and III. Furthermore, there is no process claims dependent from the product of claim 2.

The requirement is still deemed proper and is therefore made FINAL.

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Claims 1 and 3-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 7.

### ***Specification***

The examiner notes that the sequence search performed at US PTO shows that SEQ ID NO:10 is 19.4 % identical to SEQ ID NO:1 whereas the specification states 56.5% identity (page 2, lines 30-31). Clarification is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 2 is directed to a variant of a *Myceliophthora thermophila* laccase which comprises a mutation corresponding to at least one of the 14 specific positions in SEQ

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ID NO:10. Since “comprising” is open language, the number of allowed additional mutations is not limited. The specific mutations represent about 0.17%-2.4% of SEQ ID NO:10 that is 573 amino acid long. This amounts to said genus of variants being characterized by laccase function. Therefore, the genus of said variant laccases encompasses enzymes with structures with any possibly low homology to SEQ ID NO:10 having different properties. While applicants disclose variants having the amino acid sequences that differ from SEQ ID NO:10 by mutations at the indicated positions, the claimed genus is highly variable as it encompasses great number of undisclosed variants with undisclosed structures and properties.

Moreover, the specification fails to describe any other representative species with changes in positions other than specifically indicated by any identifying characteristics or properties other than the “functionality” of being a laccase variant and fails to provide any structure: function correlation present in all members of the claimed genus. Therefore, the specification is insufficient to put one of skill in the art in possession of the attributes and features of all species within the claimed genus. Therefore, one skilled in the art cannot reasonably conclude that the applicant had possession of the claimed invention at the time the instant application was filed.

Claim 2 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a variant of a *Myceliophthora thermophila*

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laccase having an amino acid sequence that differs from SEQ ID NO:10 by a mutation corresponding to at least one of the 14 specific positions therein, does not reasonably provide enablement for a variant of a *Myceliophthora thermophila* laccase having an amino acid sequence that comprises a mutation corresponding to at least one of the 14 specific positions wherein said variant amino acid sequence has unknown homology to SEQ ID NO:10. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, how to make the invention commensurate in scope with these claims.

Factors to be considered in determining whether undue experimentation is required, are summarized in In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir. 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) considered in determining whether undue experimentation is required, are summarized the predictability or unpredictability of the art, and (8) the breadth of the claims.

Claim 2 is directed to a variant of a *Myceliophthora thermophila* laccase having an amino acid sequence comprising a mutation in SEQ ID NO:10 corresponding to at least one of the 14 specific positions of any structure and properties (the number of possible mutations is not limited).

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Claim 2 is so broad as to encompass any variant of a *Myceliophthora thermophila* laccase having an amino acid sequence comprising a mutation corresponding to at least one of the 14 specific positions in SEQ ID NO:10 with unknown possible low homology to the laccase of *Myceliophthora thermophila*. The scope of the claim is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of variant laccase enzymes broadly encompassed by the claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to the amino acid sequence of the variants having the mutations at the specific positions in SEQ ID NO:10.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is

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unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

The specification does not support the broad scope of the claims which encompass any mutant luciferase having the requisite property with an undisclosed homology to the laccase of *Myceliophthora thermophila* in which the amino acid corresponding to the specific positions in SEQ ID NO:10 is mutated because the specification does not establish: (A) regions of the protein structure which may be modified without effecting laccase activity; (B) the general tolerance of laccases to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any laccase residues with an expectation of retaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make the claimed invention in a manner reasonably correlated with the scope of the claims broadly including any number of amino acid modifications in laccase of *Myceliophthora thermophila* sequence in addition to the specific mutations recited in the claim. The scope of the claims must bear a reasonable correlation with the scope of enablement (In re Fisher, 166 USPQ 19 24 (CCPA 1970)). Without



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sufficient guidance, making variant laccases is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claim 2 is rejected under 35 U.S.C. 102(a), (e) as being anticipated by Pedersen et al.

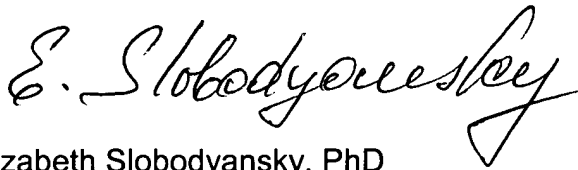
Pedersen et al. (US Patent 5,925,554) teach *Myceliophthora thermophila* laccase mutated at position Y177 (claims 1-3).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Slobodyansky whose telephone number is (703) 306-3222. The examiner can normally be reached Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ponnathapura Achutamurthy, can be reached at (703) 308-3804. The FAX phone number for Technology Center 1600 is (703) 308-4242.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Center receptionist whose telephone number is (703) 308-0196.

A handwritten signature in cursive script, reading "E. Slobodyansky". The signature is written in black ink and is positioned above the printed name.

Elizabeth Slobodyansky, PhD  
Primary Examiner

December 12, 2002